Grupa LOTOS S.A.	**TECHNICAL SPECIFICATION**	Spec. No. 6200
	CAD Standard and requirements for documentation delivered as electronic files	

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1 Subject of specification

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This specification used in conjunction with other technical specifications of LOTOS Group S.A. establishes the minimum requirements for the design and execution of drawing documentation delivered as electronic files.

2 Scope of validity

This specification applies to the preparation of tender documents, inquiries and contracts concerning new investments and modernization projects planned by LOTOS Group S.A.

It shall also be a basis for preparing both detailed specifications and inquiries for individual or package unit supplies.

2.1 Deviations

Any deviations from this specification and relevant specifications, standards and documents, including the bidder's proposals indicating a more economic design or solution, shall be submitted in writing for checking and approval by LOTOS Group S.A. No deviation or modification shall be permitted unless confirmed in writing by LOTOS Group S.A.

The bidder shall present in written form any ambiguity in this standard or any other LOTOS Group S.A standards as well as conflict with referenced documents/standards, and shall receive LOTOS Group's written explanation.

3 General requirements

3.1 Files formats

- Drawings shall be delivered as DWG files or DXF files, as compatible with AutoCAD 2004 or MicroStation-compatible DGNs (the use of Microstation software does not apply to drawings on geodetic maps)
- Others documents deliverable with drawings, shall be delivered as following files: Microsoft Word (*.DOC), Microsoft Excel (*.XLS), Acrobat Reader (*.PDF), HTML or plain text (*.TXT)
- In case of plain text files, coding shall be according to CP-1250 (i.e. MS Windows CodePage, Eastern and Central Europe)

3.2 Recordable media, required meta files

Required media for deliverable files is CD/ DVD disc (with paper protocol of delivery). Apart of Drawings files, the CD/DVD shall consist meta-files with following data:

- File where content of CD/DVD is specified (for each drawing: file-name, document title and document number acc. to Numbering system and procedure, revision, drawing title). This file shall be named INDEX.* (where * is proper file extension).
- File where rules for plotting are described (colours and pen width for each used ACI colour or for layers). Those file shall be named WYDRUKI.* (where * is proper file extension).
- Independent to file described above, also plot configurations files should be delivered (*.PCP, *.PC2, *.CTB, or *.STB, according to used AutoCAD version)

- E-mail communication can be used only for information purposes not for delivery official issues of documentation.

3.3 Colours settings

For each drawing elements, color shall be defined as BYLAYER. Color setting directly to drawing elements is not allowed.

If Microstation software is used, only the preservation of line thickness shall be required.

3.3.1 Following settings are recommended for monochrome plotted drawings

AutoCAD Color Index (color displayed by AutoCAD on screen)	Line thickness (displayed by MicroStation software on the screen)	Line thickness on monochrome outplot
red (1)	0	0,18 mm
white/black (7)	1	0,25 mm
yellow (2)	2	0,35 mm
green (3)	3	0,50mm
blue (5)	4	0,70 mm
magenta (6)	7	1,00 mm
(15)	10	1.50mm

Additionally:

(10)	3	0,50mm

4 Requirements for the documentation including designs of land development prepared using cartographical data in DWG files issued by LOTOS S.A. Group Master Plan Team

4.1 General information

4.1.1 For the purposes of land development design and obtaining branch agreements, the Master Plan Team shall issue and share area maps with an annotation **"do celów informacyjnych" ("for information purposes")**.

4.1.2 After the designer conducts all necessary interviews, agreements and arrangements concerning the location or the process of planned land development, the design office shall request a map with an annotation **"do celów projektowych" ("for design purposes")** (only for the area necessary for the design preparation). While ordering the maps, the paragraph 4.1.4. shall be taken into account.

4.1.3 Geodesic maps for the design purposes on the LOTOS Group S.A. (hereinafter referred to as the maps for design purposes) are shared at the request in the format of DWG file (AutoCAD 2004, basic drawing unit – 1 metre). It is important to note that the full scope of the map is presented only within the area marked with the scope line (layer: ZAKRES_OPRACOWANIA_MAPY).

4.1.4 Depending on the scope of the design, black-and-white or colour maps may be used while preparing the land development design. For the multi-branch designs (for example building permit documentation), black-and-white maps shall be used. For the one-branch designs (e.g. related to

performance) colour maps shall be used. Detailed rules for preparation of plan variants are covered by points 4.3.2 and 4.3.3

4.1.5 Maps for design purposes are prepared for the specific scale. The size of symbols, styles and line width is specific for the maps prepared in a particular scale, therefore it **shall not be permitted** to re-scale the map. The basic scale for design developments on the GLSA area is 1:250. For the highly-developed areas, the design shall be made on the basis of the map with the scale 1:100. Maps scaled 1:500 may be used for designs of linear character (e.g. on existing trestles), or on areas where the existing and planned development density is low.

4.1.6 The decision about the proper scale or scales for a given development design shall be made after consultation with the Master Plan Team Director, on the basis of design assumptions and the map for information purposes.

4.1.7 For the preparation of land development design drawings, only the necessary part of the map from the area demarcated with scope line "zakres opracowania mapy" shall be used. It is necessary to adjust the printing sheet, so that it encompasses the whole frame of the map, together with its legend.

4.1.8 On the designers demand, the Master Plan Team may, apart from digital data, prepare map printouts with appropriate annotations.

4.1.9 Notice! Without a permission of the Master Plan Team Director it shall not be allowed to use cartographic materials received beforehand for other design preparations for new designs executed.

4.2 Information about the data included in the maps

4.2.1 The DWG file issued by Master Plan Team shall not be modified as far as the map content is concerned and shall constitute the basis for the land development design prepared by the designer.

4.2.2 The map drawing includes layers with names beginning with "**PROJ**._", which contain the planned development agreed by the Team, but not executed. It shall be treated in the same way as existing development.

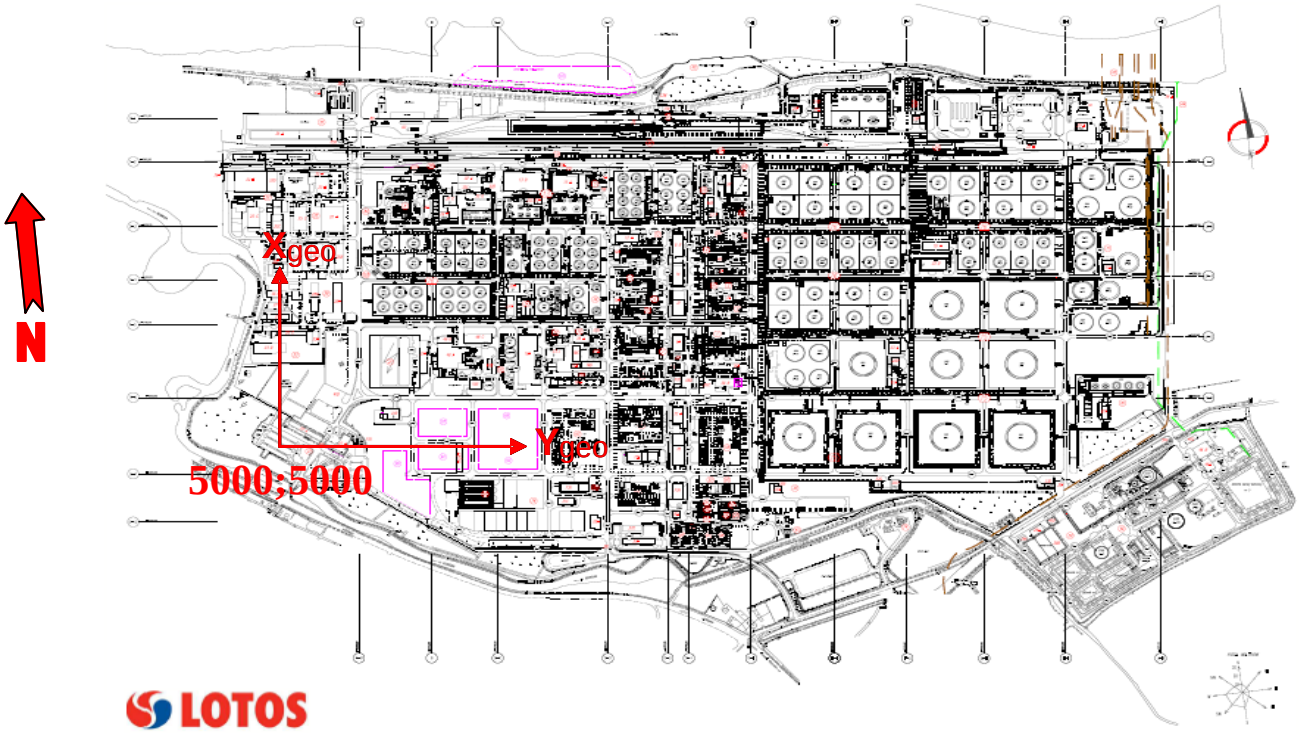
4.2.3 Map content is identifiable through the location on a specified layer labelled according to its content (layer manager description field).

4.2.4 Maps are oriented in the system of local coordinates of the execution grid of LOTOS Group (Ygeo, Xgeo). The diversion of the local system from the state system equals c. 9° to the west. Notice! The value of Cartesian X indicated by AutoCAD responds to the geodesic system coordinate **Ygeo**, while the value of Cartesian Y indicated by AutoCAD responds to the geodesic system coordinate **Xgeo**.

The map includes the grids of local(XGL; YGL) and state reference system „Gdańsk '70" (X70, Y70) together with coordinate descriptions.

4.2.5 The altitude system in LOTOS Group is a local system, the origin of which is oriented 100.07 m above the state altitude level "0 Kronsztadt". The dependence is given in the map legend.

4.2.6 The drawing below shows an approximate plan of the plant's area and the roads axes system within the LOTOS Group local geodesic co-ordinate system:


N
Xgeo
Ygeo
5000;5000
LOTOS

List of the main conventional signs used in Master Plan maps



4.3 Rules of proceedings and preparation of design documentation to be submitted for the opinion of LOTOS Group Master Plan Team.

4.3.1 Digital documentation related to land development designs submitted to Master Plan Team for opinion and agreement on the location shall include the unchanged content of the issued map with newly-designed elements of the land development added on appropriate layers.

4.3.2 If the drawing part of the design includes the collective chart of land development, the provisions of point 4.1.4 shall apply. For such designs, a black-and-white map shall be used and the designed networks of utilities shall be drawn with colours appropriate for particular branches, according to the map legend. Designed over-ground elements of land development (e.g. buildings, foundations, tanks and their trays, retaining walls, roads etc.) in this plan variant shall be indicated in colour 221 (as for the layer **0_PROJ_SYT_I_OPIS**).

4.3.3 If the design consists in development of only one branch (Remark: water and sewer installation branch is treated as one), the colours shall be compliant with the Master Plan legend, and the designed elements of land development shall be drawn with colour 221 (magenta), bold line (0.4 mm), while descriptive elements with line 0.18 mm for scales 1:100 and 1:250 and 0.09 for scale 1:500.

4.3.4 Any additional graphic and descriptive elements which do not consist the content of the Master Plan maps shall be placed on other, created layers, which are not submitted to opinion (e.g. places of cross-sections, detailed marking of materials, cable types etc). Because of the need to maintain the clarity of

the map, the colour, size and type of lines for these elements shall be adjusted to the design scale, development density and neighbouring symbols on the map.

4.3.5 Layers available for edition by the designer and subject to Master Plan Team's opinion are:

4.3.5.1 **0_PROJ_SYT_I_OPIS** – designed development elements and their descriptions (e.g. number of the facility, type of foundation, description of a building, floor level or other data characteristic of the objects),

4.3.5.2 **0_PROJ_U_XXX** [where XXX means one of twelve defined layers for pipelines, wires and canals of all utilities; XXX has the following values: SEWERAGE, WATER, PROCESS, HEAT, GAS, ELECTRICITY, INSTRUMENTATION, TELECOMMUNICATION, ALARM, EARTHING, OTHER, DUCTS) – designed infrastructure, fittings and description data that are the subject of the map (e.g. the number of designed cables, the type of network, the tag of the element on the designed land development plan, etc.),

4.3.5.3 **0_PROJ_USUWANE** – crossed-out elements planned to be removed (the symbol of the cross is defined in the drawing under the name „usu" – it is inserted by „insert" command in AUTOCAD),

4.3.5.4 **0_PROJ_ELEM_LOKAL** – location elements of the facilities in the design, i.e. axes, corners and refraction co-ordinates, measures from fixed elements of existing land development, and spans and dimensions concerning geometry of surface objects (e.g. building, foundation, chamber, tank, etc.).

4.3.6 In a prepared design it is necessary to show other planned elements of land development that are the subject of simultaneously executed by the Office and mutually intertwined branch designs on the layer **0_PROJ_INNE_PROJEKTY** (colour 241). The information about the number of the design and drawing (according to the marking standard of LOTOS Group's no. 6110) for these elements shall be given in the notes to the drawing.

4.3.7 Rules for lines and texts in the land development drawings:

4.3.7.1 A required style of the text is K1_ACAD;

4.3.7.2 Drawing elements that may be used are: a line, a polyline, a polygon, a rectangle, an arc, a circle, a version cloud, a block, a point, a text, measuring);

4.3.7.3 It is not permitted to use elements of SPLINE type;

4.3.7.4 All elements shall be plotted for the line type scale set at 1.

4.3.8 Because of the verification process of the designed development plan, it is advised that the development design should be done on the basis of a conventional signs catalogue of Master Plan, enclosed to this standard, and the types of lines included in the map drawing template.

4.3.9 The designed cable routes should be drawn with a polyline with a description of the type of network and number of wires on the particular segment, e.g. eN2, eW5, t6, KiA3, v5. In the event that the design includes the construction of cable ducting, the network tagging should include an additional letter "k" and the number of openings, e.g. tk5.

4.3.10 The underground are drawn with continuous lines and over-ground routes with PRNAD dashed line, included in the map drawing template.

4.3.11 In the DWG file prepared by the Master Plan there is a sheet printout tab. The designer shall add to it an identification table compliant with the standard no. 6110, and a descriptive part together with the legend for the symbols used in the design. If the plan drawing is to be built of several sheets (pages), an overview drawing of the design sheets should be placed in the legend.

4.3.12 In order to prepare land development design printouts compliant with the standard, it is required to:

4.3.12.1 use the printout configuration file (Lotos.ctb) provided with the map,

4.3.12.2 save the map orientation file – rafka4.jpg (or lotos_kolej.jpg for areas of Lotos KOLEJ) in the same folder, or give a path to the file,

4.3.12.3 put the files lot.shx and z23.shx, which contains symbol definitions for line styles in the subfolder SUPPORT in the AUTOCAD catalogue.

4.3.13 After conclusion of the design the DWG drawing files and a PDF files showing a final design printout shall be sent to the Master Plan Department together with information concerning the design under execution for the opinion to be issued on location of planned land development and compliance with the standard hereby. In order to ensure correct design file identification, the files shall be named according to the rules of documentation numbering procedure.

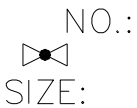
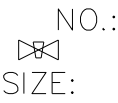
4.3.14 After acquiring initial agreement in the form of an opinion sent by the Internet, in order to get the final agreement one shall submit a set of final printouts and files. Before being handed down to the ordering unit, documentation is stamped with an agreement annotation in the Master Plan Department. For the purposes of the Master Plan Archive, printouts of the land development plan shall be prepared together with the title page, design description and other drawings containing precise measuring of planned development.

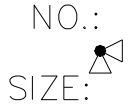
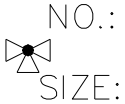
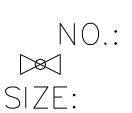
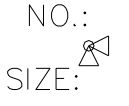
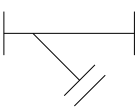
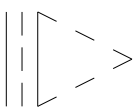
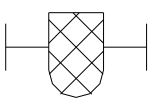
5 Requirements to process and instrumentation drawings

5.1 CAD symbols

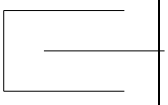
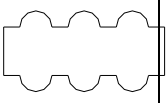
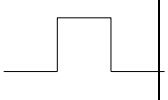
If AutoCAD software is used we speak of using a „block" for a given symbol, and if Microstation software is used we speak of using a „cell" for a given symbol.

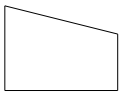
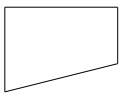
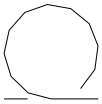
5.1.1 Piping symbols

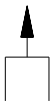
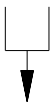
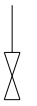
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 101.DWG	**gate valve, strai ght run valve**
	RGPRO 102.DWG	**angle valve**
	RGPRO 103.DWG	**three way valve**
	RGPRO 104.DWG	**four way valve**
	RGPRO 105.DWG	**double-seat valve**
	RGPRO 111.DWG	**globe valve**
	RGPRO 124.DWG	**four way ball valve**
	RGPRO 131.DWG	**plug valve**
	RGPRO 132.DWG	**angle plug valve**
	RGPRO 133.DWG	**three way plug valve**
	RGPRO 141.DWG	**needle valve**

SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 112.DWG	**angle globe valve**
	RGPRO 113.DWG	**three way globe valve**
	RGPRO 114.DWG	**four way globe valve**
	RGPRO 121.DWG	**ball valve**
	RGPRO 122.DWG	**angle ball valve**
	RGPRO 123.DWG	**three way ball valve**
	RGPRO 211.DWG	**Y-type strainer**
	RGPRO 212.DWG	**wire mesh strainer**
	RGPRO 213.DWG	**basket-type str ainer**
	RGPRO 216.DWG	**open end, f langed end**
	RGPRO 217.DWG	**companion flange, blind flange**

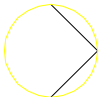
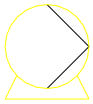
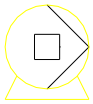
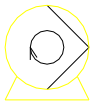
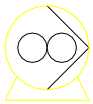
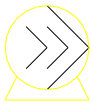
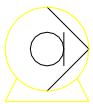
SYMBOL	FILE NAME	DESCRIPTION
NO.: SIZE:	RGPRO 146.DWG	**pinch valve**
NO.: SIZE:	RGPRO 151.DWG	**diaphragm valve**
NO.: SIZE:	RGPRO 156.DWG	**butterfly valve**
NO.: SIZE:	RGPRO 161.DWG	**excess flow valve**
NO.: SIZE:	RGPRO 166.DWG	**check valve**
	RGPRO 201.DWG	**steam trap**
	RGPRO 206.DWG	**drain, sewer,or waste trap**
	RGPRO 225.DWG	**coupling**
	RGPRO 226.DWG	**welding connection**
	RGPRO 231.DWG	**spacer**
	RGPRO 232.DWG	**spade blind**

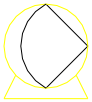
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 218.DWG	**flanged or blind flanged connection**
	RGPRO 219.DWG	**companion screwed connection, screwedblind**
	RGPRO 220.DWG	**screwed connection, screwed blind**
	RGPRO 221.DWG	**end cap**
	RGPRO 222.DWG	**end head plug**
	RGPRO 223.DWG	**hose connection**
	RGPRO 224.DWG	**union**
	RGPRO 243.DWG	**expansion gland**
	RGPRO 244.DWG	**expansion bellow**
	RGPRO 245.DWG	**expansion u-bend**
	RGPRO 246.DWG	**flexible line**

SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 233.DWG	**spectable blind normally closed**
	RGPRO 234.DWG	**spectable blind normally open**
	RGPRO 236.DWG	**concentric reducer**
	RGPRO 237.DWG	**eccentric reducer bottom flat**
	RGPRO 238.DWG	**eccentric reducer top flat**
	RGPRO 241.DWG	**lyre shaped bend**
	RGPRO 242.DWG	**expansion loop**
	RGPRO 261.DWG	**open funnel or sewer**
	RGPRO 262.DWG	**closed funnel or sewer**

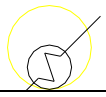
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 251.DWG	**vent**
	RGPRO 252.DWG	**drain**
	RGPRO 253.DWG	**vent plug**
	RGPRO 254.DWG	**drain plug**
	RGPRO 255.DWG	**additional nozzle**
	RGPRO 256.DWG	**sample point**
	RGPRO 2576.DWG	**sample point with cooler**
	RGPRO 263.DWG	**abat vent**
	RGPRO 264.DWG	**open vent**

5.1.2 Machinery and apparatus

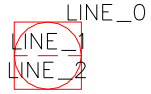
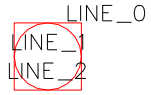
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 401.DWG	**in line pump**
	RGPRO 402.DWG	**centrifugal pump**
	RGPRO 403.DWG	**positive displac ement pump**
	RGPRO 404.DWG	**vane pump**
	RGPRO 405.DWG	**spurgear pump**
	RGPRO 406.DWG	**moyno pump**
	RGPRO 407.DWG	**peristatic pump**
	RGPRO 408.DWG	**piston pump**
	RGPRO 426.DWG	**diaphragm compressor**
	RGPRO 427.DWG	**liquid compressor**

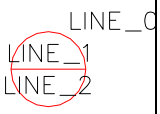
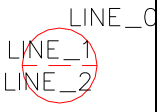
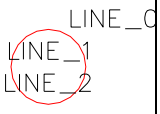
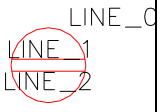
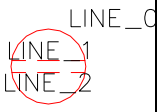
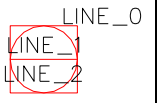
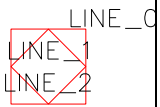
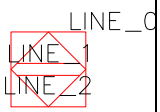
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 409.DWG	**diaphragm pump**
	RGPRO 410.DWG	**rotating piston pump**
	RGPRO 411.DWG	**submersible pump**
	RGPRO 421.DWG	**centrifugal compressor**
	RGPRO 422.DWG	**positive displaycement compres sor**
	RGPRO 423.DWG	**vane compressor**
	RGPRO 424.DWG	**spurgear compressor**
	RGPRO 425.DWG	**moyno compressor**
	RGPRO 449.DWG	**structure mixer**
	RGPRO 450.DWG	**turbine mixer**

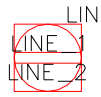
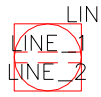
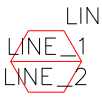
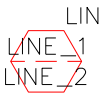
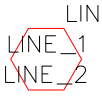
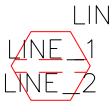
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 428.DWG	**blower, ventilator**
	RGPRO 441.DWG	**mixer**
	RGPRO 442.DWG	propellor mixer
	RGPRO 443.DWG	**flat blade mixer**
	RGPRO 444.DWG	**rack mixer**
	RGPRO 445.DWG	**beam mixer**
	RGPRO 446.DWG	**anchor mixer**
	RGPRO 447.DWG	**helical ribbon** mixer
	RGPRO 448.DWG	**pitched blade mixer**
	RGPRO 496.DWG	heat exchanger
	RGPRO 497.DWG	heat exchanger

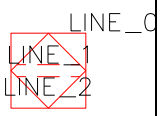
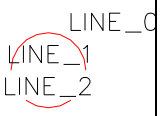
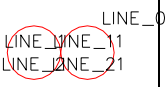
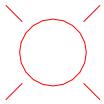
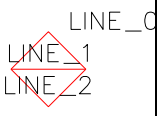
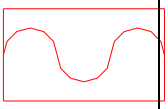
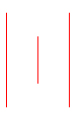
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 450.DWG	**radial turbine mixer**
	RGPRO 461.DWG	**rotating motor**
	RGPRO 462.DWG	**linear motor**
	RGPRO 471.DWG	**turbine**
	RGPRO 476.DWG	**ejector, injector**
	RGPRO 481.DWG	**detonation arrestor**
	RGPRO 482.DWG	**flame arrestor**
	RGPRO 486.DWG	**silencer**
	RGPRO 491.DWG	pulsation damper
	RGPRO 498.DWG	kettle type heat exchanger

5.1.3 Instrumentation symbols

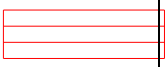
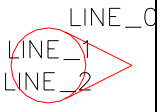
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 601.DWG	pneumatic signal (drawn on line)
	RGPRO 602.DWG	electric signal (drawn on line) also in use dashed line, acc. to ANSI/ISA-S5.1-1984)
	RGPRO 603.DWG	**hydraulic signal (drawn on line)**
	RGPRO 604.DWG	**capillary tube (drawn on line)**
	RGPRO 607.DWG	**internal system link (software or data link)**
	RGPRO 608.DWG	**mechanikal link (drawn on line)**
	RGPRO 632.DWG	**shared display or control in primary location normally inaccessible to operator**
	RGPRO 633.DWG	**field mounted shared display or cont rol**

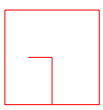
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 621.DWG	**instrument in primary location normally accessible to operator**
	RGPRO 622.DWG	**instrument in primary location normally inaccessible to operator**
	RGPRO 623.DWG	**field mounted instrument**
	RGPRO 624.DWG	**instrument in auxiliary location normally accessible to operator**
	RGPRO 625.DWG	**instrument in auxiliary location normally in accessible to operator**
	RGPRO 631.DWG	**shared display or control in primary location normally accessible to operator**
	RGPRO 653.DWG	**field mounted programable logic control**
	RGPRO 654.DWG	**programable logic control in auxiliary location normally accessible to operator**

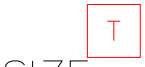
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 634.DWG	**shared display or control in auxiliary location normally accessible to operator**
	RGPRO 635.DWG	**shared display or control in auxiliary location normally inaccessible to operator**
	RGPRO 641.DWG	computer function in primary location normally accessible to operator
	RGPRO 642.DWG	computer function **in primary location normally inaccessible to operator**
	RGPRO 643.DWG	**field mounted computer function**
	RGPRO 644.DWG	**computer function in auxiliary location normally accessible to operator**
	RGPRO 645.DWG	**computer function in auxiliary location normally inaccessible to operator**
	RGPRO 651.DWG	**programable logic control in primary location normally accessible to operator**
	RGPRO 652.DWG	**programable logic control in primary location normally** inaccessible
	RGPRO 681.DWG	**diaphragm, spring -opposed or unspecified actuator**

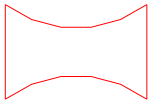
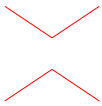
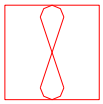
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 655.DWG	**programable logic control in auxiliary location normally inaccessible to operator**
	RGPRO 661.DWG	**instrument with long tag number**
	RGPRO 662.DWG	**instruments sharing common housing**
	RGPRO 663.DWG	**pilot light**
	RGPRO 664.DWG	**panel mounted patch board point**
	RGPRO 665.DWG	**purge or flushing device**
	RGPRO 666.DWG	**reset for lath-type actuator**
	RGPRO 667.DWG	**diaphragm seal**
	RGPRO 668.DWG	**undefined interlock logic**
	RGPRO 701.DWG	**restriction orifice**

SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 682.DWG	**diaphragm pressure - balanced actuator**
	RGPRO 683.DWG	rotary motor actuator
	RGPRO 684.DWG	**digital actuator**
	RGPRO 685.DWG	spring-opposed cylinder actuator
	RGPRO 686.DWG	solenoid actuator
	RGPRO 687.DWG	**electrohydraulic actuator**
	RGPRO 688.DWG	valve actuator
	RGPRO 689.DWG	**a spring, weight or integral pilot (for pressure relief or safety valves only)**
	RGPRO 690.DWG	**hand actuator or handwheel**
	RGPRO 715.DWG	**backpressure regulator with external pressure tap**

SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 702.DWG	**restriction orifice drilled in valve (block valve)**
	RGPRO 703.DWG	**flow straightening vane**
	RGPRO 704.DWG	**variable area meter (rotameter)**
	RGPRO 706.DWG	**hand control valve**
	RGPRO 707.DWG	**mechanical linkage control valve**
	RGPRO 711.DWG	**self-contained pressure-reducing regulator with handwheel adjustable set point**
	RGPRO 712.DWG	**pressure-reducing regulator with external pressure tap**
	RGPRO 713.DWG	**differential pressure-reducing regulator with internal and external pressure taps**
	RGPRO 714.DWG	**self-contained backpressure regulator**
	RGPRO 725.DWG	**pilot operated relief valve**

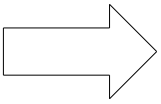
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 716.DWG	pressure-reducing regulator
	RGPRO 717.DWG	**pressure relief or safety angle valve, general symbol**
	RGPRO 718.DWG	**pressure relief or safety straight - through valve, general symbol**
	RGPRO 719.DWG	**vacuum relief angle valve, general symbol**
	RGPRO 720.DWG	**pressure and vacuum relief valve, general symbol**
	RGPRO 721.DWG	**pressure and vacuum relief manhole cover**
	RGPRO 722.DWG	pressure relief or safety angle valve tripped by internal solenoid
	RGPRO 723.DWG	rupture disk or safety head for pressure relief
	RGPRO 761.DWG	orifice plate in quick-change fitting
	RGPRO 762.DWG	single port pitot tube or pitot-venturi tube

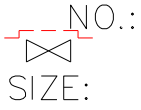
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 726.DWG	**breathing valve**
	RGPRO 727.DWG	**breathing valve with flame arrestor**
	RGPRO 728.DWG	**steam trap assembly**
	RGPRO 741.DWG	**fail open two -way valve**
	RGPRO 742.DWG	**fail closed two-way valve**
	RGPRO 743.DWG	**fail open to path three-way valve**
	RGPRO 744.DWG	**fail open to paths four-way valve**
	RGPRO 745.DWG	fail locked valve
	RGPRO 769.DWG	vortex sensor
	RGPRO 720.DWG	target type sensor

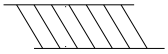
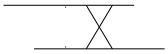
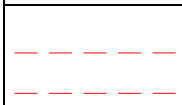
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 763.DWG	venturi tube
	RGPRO 764.DWG	averaging pitot tube
	RGPRO 765.DWG	flume
	RGPRO 766.DWG	weir
	RGPRO 767.DWG	turbine - or propeller-type flow rate
	RGPRO 768.DWG	positive displacement flow totalizing indicator

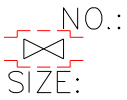
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 771.DWG	flow nozzle
	RGPRO 772.DWG	magnetic flowmeter
	RGPRO 773.DWG	sonic flowmeter
	RGPRO 774.DWG	iluminator
	RGPRO 781.DWG	flashing light
	RGPRO 782.DWG	audible alarm

5.1.4 Others symbols

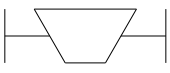
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 801.DWG	input/output flow arrow
	RGPRO 802.DWG	power or auxiliary input/output flow arrow
	RGPRO 808.DWG	instrument arrow

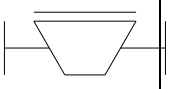
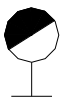
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 806.DWG	flow arrow
	RGPRO 807.DWG	pipeline interruption
	RGPRO 835.DWG	valve steam tracing

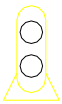
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 809.DWG	crossing dot
	RGPRO 810.DWG	flow indicating arrow
	RGPRO 831.DWG	pipe hot insulation
	RGPRO 832.DWG	pipe cold insulation
	RGPRO 833.DWG	pipe steam tracing
	RGPRO 834.DWG	pipe jacket tracing

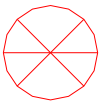
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 836.DWG	valve jacket tracing
	RGPRO 837.DWG	electrical isolated connection
	RGPRO 838.DWG	equipment hot insulation
	RGPRO 839.DWG	equipment cold ins ulation
	RGPRO 861.DWG	pipe elevation
	RGPRO 866.DWG	change in pipe classification

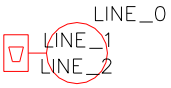
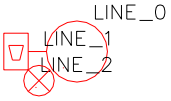
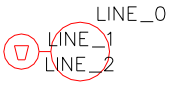
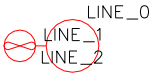
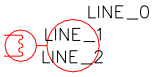
5.1.5 Symbols used on documentation of existing plants (not recommended to use in new documentation)

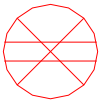
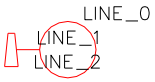
SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 901.DWG	check valve
	RGPRO 906.DWG	thermodynamic steam trap
	RGPRO 909.DWG	automatic deaeration

SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 907.DWG	bimetallic steam trap
	RGPRO 908.DWG	automatic aeration
	RGPRO 934.DWG	console pneumatic input electric output conventer

SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 911.DWG	wire mesh strainer
	RGPRO 916.DWG	centrifugal pump - general symbol
	RGPRO 917.DWG	positive displacement pump - general symbol
	RGPRO 921.DWG	local electric input pneumatic output conventer
	RGPRO 922.DWG	behind control room panel electric input pneumatic output conventer
	RGPRO 923.DWG	behind local panel electric input pneumatic output conventer
	RGPRO 924.DWG	console electric input pneumatic output conventer
	RGPRO 931.DWG	local pneumatic input electric output

SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 941.DWG	local electric input electric output conventer
	RGPRO 942.DWG	behind control room panel electric input electric output conventer
	RGPRO 943.DWG	behind local panel electric input electric output conventer
	RGPRO 944.DWG	console electric input electric output conventer
	RGPRO 951.DWG	local transmitter
	RGPRO 952.DWG	behind control room panel transmitter
	RGPRO 953.DWG	behind local panel transmitter
	RGPRO 954.DWG	control room panel transmitter

SYMBOL	FILE NAME	DESCRIPTION
		conventer
	RGPRO 932.DWG	behind control room panel pneumatic input electric output conventer
	RGPRO 933.DWG	behind local panel pneumatic input electric output conventer
	RGPRO 971.DWG	flow indicator
	RGPRO 972.DWG	flow indicator with transmitter
	RGPRO 973.DWG	oval wheel flowmeter
	RGPRO 974.DWG	turbine type
	RGPRO 975.DWG	magnetic flowmeter

SYMBOL	FILE NAME	DESCRIPTION
	RGPRO 955.DWG	local panel transmitter
	RGPRO 961.DWG	auxiliary relay
	RGPRO 976.DWG	electric venturi tube
	RGPRO 981.DWG	linkage to process line
	RGPRO 982.DWG	pneumatic signal (drawn on line)
	RGPRO 983.DWG	electric signal (drawn on line)

6 Requirements to electrical drawings

6.1 Symbols

European Union Standards shall be applied:

- PN-EN 60417-2 to PN-EN 60617-13

7 Relevant documents

- PN-EN 60617 – 2 – Graphical symbols for diagrams. Symbol elements, qualifying symbols and other symbols having general application
- PN-EN 60617 – 3 – Graphical symbols for diagrams. Conductors and connecting devices
- PN-EN 60617 – 4 – Graphical symbols for diagrams. Basic passive components
- PN-EN 60617 – 5 – Graphical symbols for diagrams. Semiconductors and electron tubes
- PN-EN 60617 – 6 – Graphical symbols for diagrams. Production and conversion of electrical energy
- PN-EN 60617 – 7 – Graphical symbols for diagrams. Switchgear, controlgear and protective devices
- PN-EN 60617 – 8 – Graphical symbols for diagrams. Measuring instruments, lamps and signalling devices
- PN-EN 60617 – 9 – Graphical symbols for diagrams. Telecommunications. Switching and peripheral equipment
- PN-EN 60617 – 10 – Graphical symbols for diagrams. Telecommunications. Transmission
- PN-EN 60617 – 11 – Graphical symbols for diagrams. Architectural and topographical installation plans and diagrams
- PN-EN 60617 – 12 – Graphical symbols for diagrams. Binary logic elements
- PN-EN 60617 – 13 – Graphical symbols for diagrams. Analogue elements

8 Record of changes

No.	Date	Description	Introduced by
1		This specification replaces in whole the earlier LOTOS Group's standard No. PR 07 620 titled identically	B. Kowalewski
2	10.01.2013	New notations regarding p.4 have been introduced (adjusting the standard to the rules of keeping and updating the map of the refinery plant)	S. Tanan
-	31-08-2015	Page layout corrections, no contents changes.	T. Wróbel